

# [The urbanisation concepts and definitions economics essay](https://assignbuster.com/the-urbanisation-concepts-and-definitions-economics-essay/)

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## Introduction

Urbanization is an index of transformation from traditional rural economies to modern industrial one. It is progressive concentration of population in urban unit (Davis 1965 cited in Datta 2006). The level of urbanisation in India is considered to be very low. It increased slowly from17. 29 per cent in 1951 to 27. 76 per cent in 2001. This is much lower compared to the level of urbanisation in developing countries (40% in 2001). The concerning aspect of urbanisation in India is the large concentration of urban populations in its big cities. In each Census, the concentration is becoming more pronounced in the large cities. Six mega cities accounts for one fifth of the total urban population in India (Premi 2006 cited in Mitra 2011). In this context, this paper attempts to analyse the trends and patterns of urbanisation in India and the reasons for its skewed growth pattern. The reminder of this paper is organised as follows. The Indian urban process in a historical perspective is discussed in the beginning followed by literature review.

## History of Urban Processes in India

Kundu (2011) gives a useful account of the history of urbanisation in India in the colonial period. The discussion that follows is based this paper. The origin of the hierarchy of urban structure in contemporary India can be traced to the development dynamics that prevailed during the colonial period. The colonial economy generated strong commodity and population flows towards its key ports and administrative towns. This had the inevitable consequence of weakening the regional centripetal forces established during the medieval period through the inter-settlement linkages and bi-directional movement of goods and services between the core and periphery. Thus, the colonial policy given rise to the four major Urban Agglomerations of Calcutta, Madras, Bombay and Karachi (which is now in Pakistan) as focal points for generating and extracting economic surpluses. This had upset the pre-existing rural urban interactions which were gradually replaced by export-import oriented commodity flows. Movement of population to the new urban centres has further disrupted the core-periphery relationship and strengthened centrifugal forces. Unlike their counterparts in developed countries, Indian agglomerations were not a product of economic development. This process of urbanisation has resulted in the weakening of the interactive system between rural and urban areas as well as large cities and small towns. The new urban, centres endured primarily with instincts from trade, failed to disseminate impulses for balanced regional development. Instead, they acted as satellites to the port towns that were themselves satellitic to the global metropolis. This pattern of industrialisation has resulted in concentration of production units within large cities and liquidation of secondary activities from the rural hinterland. Furthermore, imports entering the market in small towns and rural areas through the trading network ushered in strong forces of de-industrialisation. The twin processes hitting hard at the economic base of the rural industries and creating enclaves of apparent affluence in select urban centres struck at the very root of the existing inter-settlement linkages and synergies across different sizes of urban centres. Public facilities were concentrated in the towns and cities and were available to only a few privileged sections of the urban community, with access of the rural population being negligible. The cultural superstructure imposed on the urban areas was not rooted in indigenous institutions, and this led to the fragmentation of tradition along the rural–urban interface. ‘ Urbanism’, cut off from the basic source of its strength, became rootless and imitative while ‘ ruralis’ was stuck within the confines of petty production and burdened by superstition, obscurantism and parochialism. With the independence in 1947, massive public sector investments was made in selected pockets which helped to restructure the urban hierarchy. But, despite various government policies and programmes to in bringing investment towards backward areas, regional disparities persisted. The transformation of large cities from colonial to national capitals meant only an increasing concentration of low productive manufacturing and service activities that could find a foothold more easily due to the changed political economy. The pace of urban growth was rapid during the first three decades after Independence, but that led to greater informalisation of the urban economy and to growing deprivation in terms of basic services.

## Literature Review

Given the importance of urbanization in a developing country like India, it must be noted that it had got little attention than it ought to have been. This is manifest in the fact that the literature on the subject in the country is limited. However, the skewed pattern of urbanization in India is noted by scholars like Amitabh Kundu as early as in the 1980’s. The National Commission on Urbanisation (1988) expressed concern over a larger proportion of urban population getting concentrated in million plus and class I cities over time, reflecting a top heavy character of Indian urban system (cited in Kundu 1994). This section provides a brief survey of relevant literature on urban process in India in general and its skewed growth pattern in particular. Kundu (1983) analyses the spatial structure of urbanisation in India and the regional variation in the growth rates of cities and towns in different size categories of towns. In the sixties and seventies, the inter-class disparity in growth rates has been much higher in smaller order towns compared to cities. In the case of cities, the disparity has gone down over time which cannot be said about the small and medium towns. In this context, he points towards a " definitive evidence of developmental dynamism" at the higher order of size class towns which is absent in the lower order of the settlement hierarchy. He attributes the reasons for this ‘ dualistic’ urban growth process to the following issues, even though he didn’t go on to elaborate and empirically validate these arguments - a) the decline in labour productivity in more than fifty per cent of the net sown area of the country, b) the decay of household and many other traditional industries in small towns together with the phenomenal growth of a few consumer goods industries and the informal sector in the large cities and c) the rising inequality in the distribution of personal disposable income which has also meant widening of the gap between the rural and urban sectors of the economy. Kundu (1994) notes that the " top heaviness" of urban structure in only the logical outcome of demographic growth since the lower limits for identifying the million plus and class I cities are fixed. According to him, non-graduation of rural settlements into towns remains a major problem in India’s urbanisation. The same issue has been noted in Kundu (2002) and he considers the absence of sectoral diversification in rural economy responsible for this. The 11th five year plan also notes that the growth of rural settlements which are acquiring urban characteristics is very slow (Planning Commission 2008). Kundu’s (2011) argument that considerable number of large villages has stagnant economies and therefore they tends to be out-migrating in character has to be seen along with this and that gives us a fairly clear picture of the slow pace of rural-urban transformation in the country. As noted earlier, the process of urbanisation in India is considered to be ‘ dualistic’ and ‘ exclusionary’. Kundu, in his subsequent papers gives out many reasons of why urbanisation in India is skewed towards large cities.[1]The major arguments in these papers can be summarised to the following points. Linking the country with the global economy has led to a rise in indigenous investment and inflow of capital from outside the country. As these investments flows to the global cities, the new manufacturing units seek locations around them. Considerations of commercial profitability and efficiency in governance do not inspire multinationals or the indigenous corporate sector to invest in small and medium towns. The small and medium towns have poor and uncertain economic base and this is the reason why they fail to attract private investment from within or outside the country. Moreover, the onset of liberalisation has worsened the economic condition of these lower order towns. Mitra (2011) gives out a detailed study of 380 class I cities/urban agglomerations (as per the 2001 population census) to examine if large cities tend to offer higher well-being than the small and medium sized cities/towns. According to him large cities seem to be more productive and industries in large urban centres are more efficient than in smaller centres of human habitation. More demand-induced employment opportunities are available in large cities which possibly grow in response to large quantum of investment undertaken therein. In a nutshell, urbanization in India does not seem to be inclusive in spite of the fact that the large cities account for a very large percentage of the total investment in all urban areas. Kundu (2011) gives a decomposition analysis of urban growth (for 2001 census) by disaggregating the total incremental urban population into four components, viz, a) natural increase on base year population and intercensal migrants (59. 4) , b) population of new towns less declassified towns(6. 2), c) net rural-urban migration(21), d) Increase due to expansion in urban area and merging of villages in towns (13). Bhagat and Soumya (2009) also gives out the decomposition analysis of urban growth with variation in the estimation for some of the components. Their result is as follows (for 2001 census) - a) natural increase (57. 6), b) net reclassification from rural to urban (12. 3), c) net rural-urban migration (20. 8), d) residual - jurisdictional changes (9. 2). Annapurna Shaw (1998) analyses investment pattern in India’s metropolitan cities and their neighbourhoods during the nineties. The study indicates the emergence of urban cores of high investment where growth is based predominantly on automobile production, consumer electronics, computer software and IT, chemicals, petrochemicals and steel production. These cores are geographically confined to the Ahmedabad- Pune urban corridor, the southern urban triangle of Bangalore- Chennai-Coimbatore, the northern region centred on the Delhi capital region and nearby areas in Rajasthan and Punjab, and new hubs of growth in the south such as Hyderabad, Vishakapatnam and Kochi. The remaining metropolises and the regions surrounding them have been virtually bypassed by the new growth that has followed the liberalisation of the Indian economy. Drastically different from the earlier discussion of literature, Denis et. al (2012) provides an alternative explanation of Indian urban process. For them, the Indian smaller town, far from being stagnant, appears to reflect growth and vibrancy. A number of them have grown steadily and appears to have a diversified economic base. The argument that small and medium towns are cut off from global linkages in misplaced. Towns like Tirupur and Ranipetti are good examples of towns with a great deal of global connectivity. They gives a new conceptual frame work to look at urbanisation in India.

## Urbanisation: Concepts and Definitions

From a demographic point of view, the level of urbanization is measured by the percentage of the population living in urban areas (Davis 1962 cited in Bhagat and Soumya 2009). During British rule in India, every municipality regardless of size, every cantonment, all civil lines not included in municipal limits, and every other collection of houses permanently inhabited by not less than 5000 persons could be considered urban as long as it exhibited an urban character even when such an area was not under municipal government (Ibid). The census of India defined the urban places on the basis of the following criteria(i) All places with a municipality, corporation, cantonment board or notified town areCommittee etc.(ii) All other places which satisfy the following criteria:(a) Minimum population of 5000;(b) At least 75% of male working population engaged in non-agricultural pursuits; and(c) A density of population of at least 400 persons per sq km (1000 per sq mile). Besides, the directors of census operations in states/union territories were allowed to include in consultation with the concerned state Governments, union territory administration and the Census Commissioner of India, some places having distinct urban characteristics as urban even if such places did not strictly satisfy all the criteria mentioned under the category (b) above (Jain et al 1992 cited in Bhagat and Soumya 2009). The cities and towns in India are classified into a six-fold classification based on population size. The classification may be shown in the following table.

## Table 1

## Urban Size Classifications in India

Size ClassPopulationsClass I100, 000 and aboveClass II50, 000 to 99, 999Class III20, 000 to 49, 999Class IV10, 000 to 19, 999Class V5, 000 to 9, 999Class VILess than 5, 000Source: Bhagat, 2005Our analysis of urbanisation in India would be based on these classifications. We refer to small towns for those categories having population less than 20, 000.

## Urbanisation in India: Trends and Patterns

The total population in India has rose from 23. 84 crores in 1901 to 102. 7 crores in 2001. Likewise, the total urban population also increased from 2. 58 crores in 1901 to 28. 53 crore in 2001 (Table A. 1 in Appendix). This process of urbanisation in India is shown in Figure 1. The graph clearly shows that urban population in India is rising at a slower pace compared to the total population. The annual exponential growth rate of population during 1950’s was 3. 5 per cent. The growth rate slowed in subsequent years. The growth rate crossed 3. 5 mark in the 1970’s and after that it decelerated to 2. 7 per cent in 1990’s.

## Figure 1

## Total and Urban Population from 1901 to 2001

Source: Census of India 1981, 1991, and 2001

## Figure 2

## Percentage Growth Rate of Urban Population since 1901

Census yearsProportion of urban populationExponential growth rateSource: Kundu 2012The skewed process of urbanisation in India clearly shown by the figure 2 and 3 and table 2. There is clear indication of the fact that the Indian urban structure has become top heavy. The number of class I towns has increased steadily over the years. It has recorded the largest increase in decadal growth rate compared to other size classes of towns during 1991-2001. During the same period, it may be seen that the growth rate of class 6 towns has become negative. Figure 4 shows that the concentration of urban population in class I towns is increasing steadily over the Census years.

## Figure 3

## Number of Towns in Different Size Categories since 1991

Number of townsSource: Census of India 1981, 1991, and 2001

## Table 2

## Decadal Growth Rate of Towns 1991-2001

Class IClass 2Class 3Class 4Class 5Class 631%16%21%15%20%-3%Source: Own Calculation based on Census data for 1991 and 2001

## Figure 4

## Proportion of Urban Population in Different Size Categories

Proportion of urban populationSource: Census of India 1981, 1991, and 2001

## 5. 1 Metropolitan Growth

As per 2001 Census, there are 35 million plus cities consisting of 107. 9 million urban population and constitute nearly 39 per cent urban population in the country (Bhagat 2005). The decadal growth rates for all 35 million plus cities separately for Urban Agglomeration (UA) and city proper (within the municipal corporation area) are presented in Table 3. It may be seen that all of the six largest metros, viz, Bombay, Calcutta, Chennai, Bangalore and Hyderabad except Delhi have recorded decline in their growth rates as defined by UA concept. In terms of city proper concept, except Bangalore all these metros. Bhagat (2005) points out that Bangalore’s growth is on account of the changes in the municipal boundaries during the 1990’s. The secondary metro cities like Pune, Surat, Patna, Kanpur, Jaipur, Indore, Jabalpur and Rajkot have shown high growth during the last two decades. The increasing congestion and crowding of the primary metro cities namely Mumbai, Chennai and Kolkata and Delhi was an added advantage to them. For example, a fast growing metro of Faridabad has emerged adjacent to Delhi along with Meerut in 2001. Surat and Pune are also growing fastly being near to Mumbai. As a result, two clusters of metropolitan dominance are clearly

## Table 3

## Growth of Population of Million Plus Cities as Per 2001 Census, 1981- 2001

U. A./City ProperUrban Agglomeration (Growth Rate)City Proper (Growth Rate)

1981-911991-20011981-911991-20011. Greater Mumbai33. 729. 920. 4202. Kolkata19. 919. 96. 64. 13. Delhi46. 951. 943. 236. 24. Chennai26. 418. 528. 99. 75. Bangalore41. 337. 87. 461. 36. Hyderabad66. 527. 439. 212. 87. Ahmedabad29. 536. 422. 918. 98. Pune44. 850. 630. 238. 39. Surat64. 485. 162. 262. 310. Kanpur23. 832. 525. 83511. Jaipur49. 653. 149. 259. 412. Lucknow65. 735. 870. 836. 313. Nagpur36. 427. 633. 226. 214. Patna19. 755. 318. 133. 415. Indore19. 747. 831. 646. 316. Vadodara33. 732. 440. 426. 617. Bhopal4436. 958. 334. 918. Coimbatore58. 431. 415. 913. 119. Ludhiana19. 633. 771. 733. 720. Kochi71. 818. 813. 52. 421. Visakhapatanam38. 325. 73328. 922. Agra75. 139. 428. 529. 223. Varanasi26. 917. 529. 618. 424. Madurai29. 31014. 6-1. 925. Meerut19. 737. 467. 942. 526. Nasik56. 558. 880. 663. 927. Jabalpur63. 725. 720. 82228. Jamshedpur17. 432. 95. 123. 829. Asansol21. 942. 742. 985. 430. Dhanbad5230. 526. 231. 131. Faridabad18. 970. 886. 770. 832. Allahabad86. 724. 328. 724. 933. Amritsar29. 942. 619. 227. 334. Vijayawada19. 219. 632. 917. 635. Rajkot47. 153. 125. 772. 8Source: Source: Census of India 1971, 81, 91 and 2001. emerging in the western and northern region of the country around the core of Mumbai and Delhi within the urban space of India (Bhagat 2005). It may be seen that all of the six largest metros, viz, Bombay, Calcutta, Chennai, Bangalore and Hyderabad except Delhi have recorded decline in their growth rates as defined by UA concept. In terms of city proper concept, except Bangalore all these metros. Bhagat (2005) points out that Bangalore’s growth is on account of the changes in the municipal boundaries during the 1990’s. The secondary metro cities like Pune, Surat, Patna, Kanpur, Jaipur, Indore, Jabalpur and Rajkot have shown high growth during the last two decades. The increasing congestion and crowding of the primary metro cities namely Mumbai, Chennai and Kolkata and Delhi was an added advantage to them. For example, a fast growing metro of Faridabad has emerged adjacent to Delhi along with Meerut in 2001. Surat and Pune are also growing fastly being near to Mumbai. As a result, two clusters of metropolitan dominance are clearly emerging in the western and northern region of the country around the core of Mumbai and Delhi within the urban space of India (Bhagat 2005). A detailed study of population growth in India’s largest metro city Mumbai is presented in Table 4. It may be seen that the growth rate of Mumbai Urban Agglomeration as a whole is significantly higher than that of the Mumbai Municipal Corporation (city proper). This indicates the faster growth of satellite towns. The growth-rate of the urban agglomeration has decreased in 1991-2001 compared to the previous decade, while that of the city has remained approximately the same. Bhagat (2005) points out that the decreased growth rate of the major major satellite towns i. e., Kalyan-Dombivli and Thane is partly due to administrative reorganization. The fastest growing satellite towns in 1991-2001 were Mira-Bhayander and Navi Mumbai. Overall, it can be seen that it is the satellite towns that drive the agglomeration growth and not the city centre itself.

## Table 4

## Growth Rates of Population in Greater Mumbai UA and its Constituents, 1981-91 and 1991-2001

UA/ConstituentsTotal PopulationGrowth Rate 1981- 91 (%)Growth Rate 1991-2001 (%)Greater Mumbai UA1636833. 4329. 94Greater Mumbai (M. Corp.)1191420. 2120. 03Thane (M. Corp)126215757. 02Kalyan-Dombivili (M. Corp)1495130. 847. 42Ulhasnagar (M. Corp)47334. 7728. 14Mira-Bhayander (M. Council)520584. 73196. 29Navi-Mumbai (M. Corp)704

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128. 76Source: Bhagat 2005Figure 5 gives the state level growth rates of size class towns in India. It can be seen that for most states, the growth rate of cities is greater than that of small towns. But, states like like Tamil Nadu, West Bengal, Karnataka and Gujarat are exception to this. In these states, small town have higher decadal growth rate than cities. Another remarkable aspect is that in the poorer states like Bihar, Jharkhand, Uttar Pradesh, Madhya Pradesh, the disparity between the growth rates of cities and smaller towns are wider. The highest adjusted growth rate among cities is observed in Haryana (45. 8 per cent) followed by Uttaranchal (44. 1 per cent) and Chhatisgarh (43. 2 per cent). The lowest growth rate among cities was found in Andhra Pradesh followed by West Bengal. But the small towns of West Bengal have grown much faster compared with other categories of towns and cities in the state. The factors such as land reforms and more equitous agrarian relation could be attributed for this pattern of urbanisation in the state of West Bengal (Bhagat 2005). Table 5

## Decadal Urban Growth Rate by Size Class of Towns in Indian States

States/CountryCities(> 100, 000)LargeTowns(100, 000-50, 000)MediumTowns(50, 000-20, 000)SmallTowns(<20, 000)TotalAndhra Pradesh11. 125. 520. 823. 815. 1Assam32. 310. 324. 527. 225. 8Bihar32. 931. 329. 726. 431. 2Chhattisgarh43. 217. 240. 819. 233. 7Goa

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16. 626. 918. 318. 2Gujarat23. 613. 220. 625. 221. 5Haryana45. 851. 937. 334. 644. 2Jharkhand28. 725. 323. 321. 525. 6Karnataka41. 939. 133. 132. 538. 6Kerala24. 333. 810. 515. 920. 0Madhya Pradesh30. 531. 625. 922. 428. 1Maharashtra32. 024. 425. 225. 930. 4Orissa32. 619. 722. 216. 724. 8Punjab25. 322. 923. 225. 124. 6Rajasthan36. 330. 425. 925. 431. 8Tami Nadu19. 811. 317. 925. 818. 9Uttar Pradesh33. 125. 429. 226. 830. 4Uttaranchal44. 131. 619. 128. 531. 5West Bengal19. 736. 821. 163. 725. 8INDIA28. 426. 124. 528. 327. 5Source: Bhagat 2005

## Reasons for Urban Concentration: Finding Empirical Evidence

We have seen in the literature review section that though the literature gives out enough reasons for urban concentration, those arguments have been not empirically validated. This section attempts to find empirical support to the arguments raised in the literature. This is done by developing two hypothesis based on the dominant section of the literature. The hypotheses areSmall and medium towns are witnessing industrial stagnation/slow down which acts as a major impediment to its growthRural- Urban migration is largely towards big cities and the share of migration to small and medium towns is very lowThe best possible way to check the first hypothesis is to look at the investment patterns across different cities and towns from the CMIE (Centre for Monitoring Indian Economy) database. But, this option is not possible as the time limitation does not permit to go for such an analysis. Moreover, the district disaggregated investment data is available only in the advanced version of the database which is not easily accessible also. The second possible way to check the hypothesis is by taking the number of industrial workers as proxy and look how it has changed over the Census years for the different size class towns. The percentage distribution of workers among different sectors is available for 1991 census (Table A. 2 in Appendix). Unfortunately, this kind of size class disaggregated data is not available for 2001 Census. Another possible option is to compare between the industrial distributions of households from NSSO rounds which comes close to the Census years. But, this requires unit level data extraction and that also does not fall within the time framework. As for the second hypothesis, desirably, we have to get the rural to urban migration levels disaggregated by the size class towns to clearly understand whether the flow is dominantly towards big cities. The Census does not provide this information. Therefore, it can be seen that severe data limitations and time constraints impinges on the testing of these hypotheses at the macro-level. From here, we move to the alternative story of small towns put forward by Denis et. al (2012). They start their analysis by asking the following question – The 2011 Census identifies 497 Class I towns. What is the origin of these towns? What were these towns like in 1961? Table 6 (along with Table A. 3, A. 4 and A. 5) can explain their position. Of the 497 towns, 37 did not have any reported population in 1961. Of the 232 that had a population of less than 50, 000 in 1961, two are today towns of more than one million. Likewise, Table A. 3 shows that while 57% of the population of current million-plus towns lived in towns of 5, 00, 000 or more in 1961, 9% of the population were in towns of less than1, 00, 000 or no reported population. Similarly, 29% of the population of current towns with population between 5, 00, 000 and one million were in towns of less than 1, 00, 000 or no reported population. As they put it " The fact that many of today’s large towns today were relatively small in the past indicates the inherent dynamism and vitality of some of these small towns".

## Table 6: Transition Matrix- 1961-2011 by Number of Towns

Size 2011 Size 19611, 00, 000to2, 00, 0002, 00, 000to3, 00, 0003, 00, 000to4, 00, 0004, 00, 000to5, 00, 0005, 00, 000to1 millionMore than1 millionTotalNA1611233236Less than 50, 00018828824123250, 000 to 1, 00, 0006035155651261, 00, 000 to 2, 00, 00038119216582, 00, 000 to 3, 00, 000

1

199203, 00, 000 to 4, 00, 000

2684, 00, 000 to 5, 00, 000

555, 00, 000 to 1 million

55More than 1 million

77Total2678336204546497Source: Denis et al 2012There is no clear picture emerging from the above discussion. The hypotheses cannot be either accepted or refuted because of the many limitations as said earlier. Moreover, the analysis by Denis et. al (2012) tends to contradict the basic argument behind the hypothesis. The situation demands a detailed study using all the data options available for getting a more clearer picture.

## Conclusion

The analysis has shown that the Indian urban structure is ‘ top heavy’. The dominance of million plus cities continues to be strong in period (1981-2001). The newly emerging metros are showing faster growth compared to the five largest metros. The rise of secondary metros like Pune, Surat, Patna, Kanpur, Jaipur, Indore and Jabalpur are happening at the same time when the dominant metros of the country are actually recording a decline. The Urban Agglomeration growth across all cities has slowed down. And, it is not the city core that is driving the agglomeration growth, but peripheral towns. The picture regarding small and medium towns’ growth is not clear. There is need for further studies to understand the growth pattern of small towns in more detail. This is not just to say about macro level analyses. Micro level studies are also equally important. Because macro data sometimes conceal micro realities and field based studies can overcome this problem. Therefore, macro and micro level studies should go in hand for a better understanding of urban process in India.

## Appendix

## Table A. 1: Population of India by Residence 1901 to 2001

Census YearsNumber of UATotal PopulationUrban PopulationRural population1901182723. 842. 5921. 251911182525. 212. 5922. 621921194925. 132. 8122. 321931207227. 903. 3524. 551941225031. 874. 4227. 451951284336. 116. 2429. 861961236343. 927. 8936. 031971259059. 8210. 9148. 901981337868. 3315. 9552. 391991376884. 4321. 7262. 7120015161102. 7028. 5474. 17Source: Datta 2005

## Table A. 2: Percentage Distribution of Urban Population in different Sectors 1991

## Size Classes

## Primary Activity

## Industry

## Trade

## Transport

## Services

Class I9. 5385. 2727. 532. 7970. 64Class II10. 916. 1229. 3423. 7514. 76Class III39. 295. 3625. 7725. 969. 01Class IV29. 482. 3813. 510. 953. 82Class V9. 910. 83. 356. 551. 41Class VI0. 880. 070. 5400. 35Source: Census 1991

## Table A. 3: Transition Matrix: 1961-2011, by Population Share (%)

Size 2011 Size 19611, 00, 000to2, 00, 0002, 00, 000to3, 00, 0003, 00, 000to4, 00, 0004, 00, 000to5, 00, 0005, 00, 000to1 millionMore than1 millionNA61351472Less than 50, 0006734221010150, 000 to 1, 00, 000254142251261, 00, 000 to 2, 00, 00011031454372, 00, 000 to 3, 00, 0001

523103, 00, 000 to 4, 00, 000

5104, 00, 000 to 5, 00, 000

75, 00, 000 to 1 million

11More than 1 million

46Source: Denis et al 2012